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Indian Standard

HYDRAULIC FLUID POWER — FLUID SAMPLE CONTAINERS — QUALIFYING AND CONTROLLING CLEANING METHODS

UDC 621·8·032 : 620·115·22

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1993 **Price Group 1**

Hydraulic Fluid Power Systems Sectional Committee, PE 15

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 3722 : 1976 'Hydraulic fluid power — Fluid sample containers — Qualifying and controlling cleaning methods', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Hydraulic Fluid Power Systems Sectional Committee (PE 15) and approval of the Production Engineering Division Council.

The text of ISO standard has been approved as suitable for publication as Indian Standard without deviation. Certain conventions are however not identical with those used in the Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

CROSS REFERENCES

In this Indian Standard, the following International Standard is referred to. Read in its place the following:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 5598 : 1985 Fluid power systems and components — Vocabulary	IS 10416 : 1992 Fluid power systems and components — Vocabulary (*first revision*)	Identical

The technical committee responsible for preparation of this standard, has reviewed the provision of the ISO Standards mentioned below and has decided that they are acceptable for use in conjunction with this standard:

ISO 4405 : 1991 Hydraulic fluid power — Determination of fluid contamination — Gravimetric method

ISO 4407 : 1991 Hydraulic fluid power — Determination of fluid contamination — Counting method under transmitted light

ISO 4408 Hydraulic fluid power — Determination of fluid contamination — Counting method under incident light (*under preparation*)

Indian Standard

HYDRAULIC FLUID POWER — FLUID SAMPLE CONTAINERS — QUALIFYING AND CONTROLLING CLEANING METHODS

0 INTRODUCTION

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. The liquid is both a lubricant and power-transmitting medium.

Reliable system performance requires control of the fluid-medium. Qualitative and quantitative determination of particulate contaminant in the fluid medium requires precision in obtaining the sample and determining the nature and extent of contamination.

A clean container is necessary in order not to "contaminate" the fluid sample. This International Standard sets forth the procedure for qualifying and controlling the cleaning methods for the container.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for qualifying and controlling the cleaning methods for sample containers used in conjunction with contaminational analysis techniques on hydraulic fluids used in industrial, mobile, marine and aerospace hydraulic fluid power applications.

It establishes a means for ensuring that the accuracy of particulate contamination analyses in hydraulic fluid power systems is not degraded by a lack of sample container cleanliness.

2 REFERENCES

ISO 4405, *Hydraulic fluid power — Determination of fluid contamination — Gravimetric method.*[1]

ISO 4407, *Hydraulic fluid power — Determination of fluid contamination — Counting method under transmitted light.*[1]

ISO 4408, *Hydraulic fluid power — Determination of fluid contamination — Counting method under incident light.*[1]

ISO 5598, *Fluid power — Vocabulary.*[1]

3 DEFINITIONS

3.1 average outgoing quality limit (AOQL) : The maximum percentage of sample containers which may exceed the required cleanliness level as a process average.

3.2 clean fluid : Fluid which is compatible with the particle counting method and the container used and does not contain more than one-tenth the number of particles greater than the designated inspection size per 100 ml that are allowed in the required cleanliness level.

3.3 consecutive acceptance number (N) : The minimum number of initial qualifying inspections required to establish the acceptability of the cleaning process.

3.4 inspection ratio (R) : The ratio of the number of randomly selected containers which must be inspected to the number of containers processed.

3.5 required cleanliness level (RCL) : The maximum number of particles greater than the designated inspection size per 100 ml of sample container volume.

3.6 For definitions of other terms used, see ISO 5598.

4 CLEANLINESS DETERMINATION PROCEDURE

4.1 Fill the sample container selected for inspection in clause 5 to 50 ± 5 % of its capacity with clean fluid.

4.2 Replace the covering film and cap and agitate the fluid in the same manner as would be used for the fluid analysis.

4.3 Using the approved particle counting method ultimately to be used on the fluid sample, determine the number of particles per 100 ml of fluid greater than the designated inspection size.

4.4 Multiply the particle count obtained in 4.3 by the ratio of the volume of fluid added to the sample container to the total volume of the sample container.

4.5 Record this number as the cleanliness level.

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[1] In preparation.

5 CONTROL PROCEDURE

5.1 Select the RCL. Do not select a number greater than 10 % of the minimum number of particles greater than the designated inspection size per 100 ml expected in the fluid to be analysed.

5.2 Select the AOQL. Base this number upon the maximum allowable percentage of unacceptable containers which would be tolerable over an extended period of time.

5.3 Select an appropriate value of *R* compatible with the process requirements. A ratio of 1 in 5 requires fewer initial qualifying inspections but more in-process inspections, whereas a ratio of 1 in 20 requires more initial qualifying inspections but reduces the in-process work load.

5.4 Obtain the value of *N* from the table, corresponding to the selected AOQL and *R*.

TABLE – **Consecutive acceptance numbers (*N*)**

Inspection ratio *R*	**AOQL values**				
	10 %	5 %	2 %	1 %	0,5 %
1 in 5	–	13	35	70	115
1 in 10	10	21	55	103	210
1 in 20	14	29	68	115	310

5.5 Initiate the processing of sample containers using the cleaning procedure to be qualified.

5.6 Determine the cleanliness level of each container (see clause 4).

5.7 Continue inspecting the containers as in 5.5 until *N* consecutive sample containers are inspected which have a cleanliness level below the RCL. This qualifies the cleaning procedure for this RCL value.

5.8 Select a new cleaning procedure if the procedure specified in 5.7 does not qualify.

5.9 Use sampling inspection once the cleaning procedure has been qualified.

5.10 Using the value of *R* selected in 5.3, choose containers at random from the process and determine their cleanliness level.

5.11 Establish acceptance of another *N* consecutive sample containers before random inspection is reinstated if any sample container in 5.7 exceeds the RCL.

5.12 If any part of the cleaning procedure is a batch process, select the value of *R* so that at least one sample is selected from each batch.

6 IDENTIFICATION STATEMENT (Reference to this International Standard)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard :

"Procedure for qualifying and controlling cleaning methods for sample containers conforms to ISO 3722, *Hydraulic fluid power – Fluid sample containers – Qualifying and controlling cleaning methods.*"

Reprography Unit, BIS, New Delhi, India

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